

# SATO Tap rapid evolution report

This report was prepared independently by mWater as part of the monitoring and evaluation contract for the UNICEF / LIXIL Sanitation Market-Shaping Partnership.



MAKE A  
SPLASH!

**SATO**  
Smart, fresh toilets

*Photo credit: Jackline Bwana.*





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## Introduction and motivation

In 2018, UNICEF and LIXIL launched Make a Splash!, a shared-value partnership to promote better sanitation and hygiene, developing a solid working relationship focused on strengthening market solutions in selected countries.

The onset of the global COVID-19 pandemic placed a spotlight on the need for improved hygiene in the home and public places and has spurred innovation by public health authorities, civil society organizations, and the private sector. SATO, a brand of LIXIL that caters to low-income communities with innovative sanitation and hygiene solutions, started ideating on a new handwashing station based on newly prioritized plans to develop a hand hygiene product.

Through a well-established line of communication, UNICEF shared insights of emerging trends and needs for hand hygiene products from over 100 countries where they operate. SATO combined this with its own market intelligence and other partner inputs and built design prototypes. These incorporated standard SATO features including water savings, simplicity, and affordability. UNICEF provided feedback and contributed to the design process with its sector knowledge, expertise, and information of existing handwashing solutions,

The final design was named SATO Tap and LIXIL went on to fabricating industrial molds working through the pandemic lockdowns and produced the first testing units used for this study. The SATO Tap is a unique handwashing device that can be attached to most locally available plastic bottles and allows handwashing with as little as 100ml. It minimizes the quantity of water dispensed for handwashing, providing the user with a steady flow of water that is easy to switch on and off.

Both institutions developed a trial protocol and carried out joint product testing of the final prototype in five markets – Bangladesh, India, Tanzania, Kenya, and Ethiopia, to assess the SATO Tap's suitability and viability as a solution to increase the demand for hand hygiene. The results have been compiled in this report.

In Ethiopia, Kenya and Tanzania, the trial was led by mWater using the Make a Splash! Partnership monitoring system. It applies an innovative model of data collection by employing a network of *youth citizen reporters* who are paid to carry out surveys on demand, using mobile data collection app on their smartphones. This approach is well suited to rapid evaluations because the youth citizen reporters were already trained and familiar with the targeted regions, having conducted several rounds of household surveys over the past year.

In Bangladesh and India, UNICEF teams used the joint protocol and led the implementation and reporting of the trial.

LIXIL and UNICEF are grateful for the work of the UNICEF country office teams in Bangladesh, India, Ethiopia, Kenya and Tanzania and the SATO teams across Africa and Asia who were all instrumental to this study. This report wouldn't be possible without them.

## Methodology

The study design includes two data sources:

1. Households, to determine whether the SATO Tap is fit for purpose, perceptions on usability, functionality, accessibility, and appeal.
2. Retailers, to understand their perceptions of the SATO Tap from a market perspective and determine their willingness and the feasibility of making this product available in the local market.

Household data was collected by enrolling households in a voluntary 1-week trial of the SATO Tap in their homes, following an initial demonstration of how to use it. The researcher conducted a Pre-Survey at the time of enrollment to record initial impressions about the product, along with some basic demographic data and the EquityTool<sup>1</sup> household assets and wealth question sets. In Ethiopia and Tanzania, the households were provided with the product free of charge but were not informed about whether they would be allowed to keep the product after one week. In Kenya, local stakeholders who were already conducting SATO toilet pan promotion activities decided to offer the product for sale to households already familiar with the SATO product line. In both cases, the researcher returned to the house one week later to conduct a follow-up interview about their experience with the product.

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<sup>1</sup> Metrics for Management (2021). [www.equitytool.org](http://www.equitytool.org)



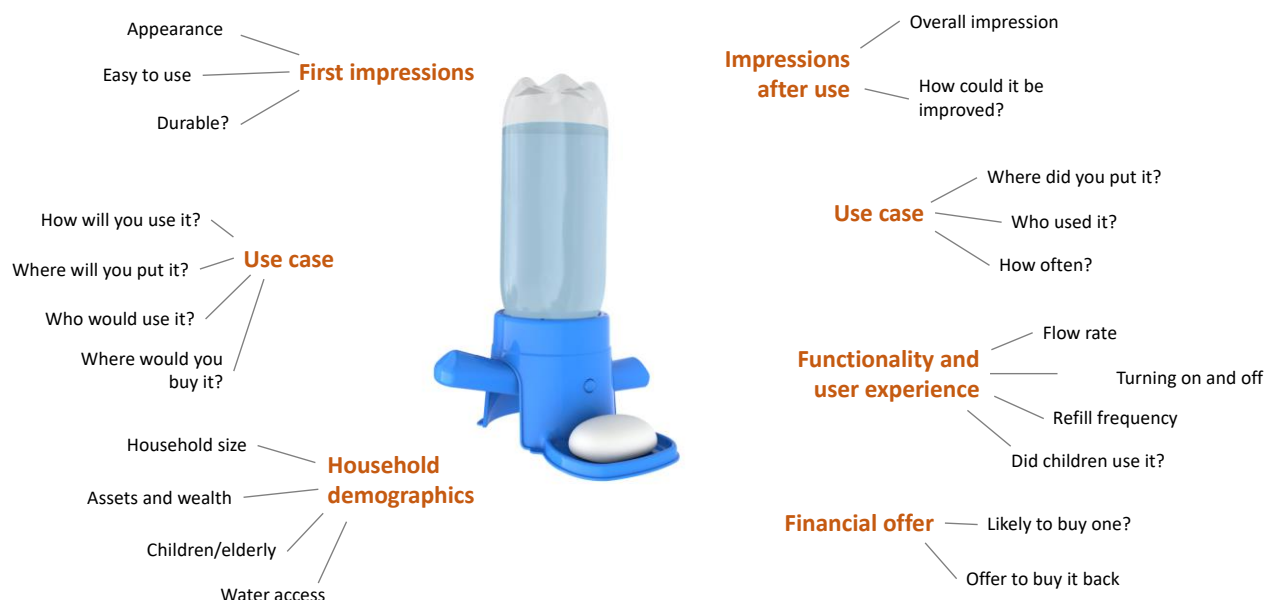


Figure 1. Key topics covered in the household questionnaires that inform the study questions.

For the retailer survey, the researcher provided a demonstration of the product and asked a series of questions. This interview also included questions about alternative handwashing products sold and other comparable products.

**Sample selection:** The study targeted 10–20 households in one village or neighborhood in each country. Researchers were guided by local health officials or community leaders to households who might be interested in enrolling, with a goal of including a wide variety of demographics, including households with children under 5, elderly members, and persons living with disabilities. In Kenya, the targeted village was in a remote, rural, and water-scarce area. In Ethiopia, urban residents who had already been identified in a previous study of sanitation among participants in the national social protection system were recruited. In Tanzania, a rural farming village was selected. The retailer survey targeted shops selling plastic goods or homeware products in the same areas as the sampled households.

**Data collection and analysis:** Three questionnaires were developed by UNICEF and mWater using a mixed methods approach, with quantitative questions about the household and their use of the product, as well as free response narrative style questions about specific topics. The questionnaires were created in the mWater digital survey format, which provides features not available in paper forms, such as conditionality of questions based on previous answers and data validation for quantitative and categorical responses. The three questionnaires are available on the mWater data portal at the following links:

- [Pre-Survey for Households](#)

- [Post-Survey for Households](#)
- [Survey for Retailers](#)

The researchers in each country were either local consultants or youth citizen reporters who had received extensive prior training in household survey techniques and qualitative research methods. Researchers were encouraged to record the full responses to narrative questions using the respondent's original words, and they used either paper notes or recordings of interviews to ensure complete capture of the responses. The survey included photos and the system required a consent question to be asked prior to allowing photos to be taken.

The analysis approach assessed the household and retailer impressions of the product along the dimensions presented earlier in the study objectives and summarized visually in Figure 1. Free response questions were analyzed using a qualitative data analysis approach in which responses were summarized by assigning thematic codes that covered the main ideas represented in the text of the response. The coding process was inductive, meaning the analyst was free to add new codes as necessary based on emerging themes in the data. Coded responses were analyzed based on the frequency of that response theme and in some cases were disaggregated by country when such differences were significant. When analysts observed a particularly salient or representative response, it was tagged and included in boxes in this report to provide additional context to the quantitative findings.

We conducted data analysis and visualization using tools available in the mWater web-based data portal. All personally identifying information about the respondents in the data sets was redacted prior to analysis. We assessed the current

household hygiene service level according to the methodology defined by the UNICEF/WHO Joint Monitoring Programme for Water and Sanitation (JMP). The relative wealth quintile of each household was determined using the EquityTool ([www.equitytool.org](http://www.equitytool.org)), which is a streamlined set of questions that can be easily observed or answered from outside the house. The answers to these 10 – 12 short questions are scored, and wealth quintiles are assigned based on the thresholds published by EquityTool, which are determined through analysis of data from recent household surveys, including the Demographics and Health Survey and the Multiple Indicator Cluster Survey.

## Household results

The study enrolled a total of 52 households across the three countries, and all but one (in Tanzania) completed the Post-Survey. The essential demographics of survey participants are presented in Table 1 below. Most of the respondents were female adult members of the household (83%). Since the respondents in Ethiopia were urban beneficiaries of social protection programs, they tended to be older and less likely to have children in the house.

Table 1. Characteristics of households enrolled in the study.

	Ethiopia	Kenya	Tanzania
Total households enrolled	18	20	14
Households with children	2	14	10
Households with elderly members	9	4	3
Average household size	6.0	8.3	5.9

An analysis of the household assets and wealth data (Figure 2) indicate that most participants in Kenya were in the lower wealth quintiles (less wealthy than others in the country), while households in Tanzania and Ethiopia were relatively wealthier than others in the country.

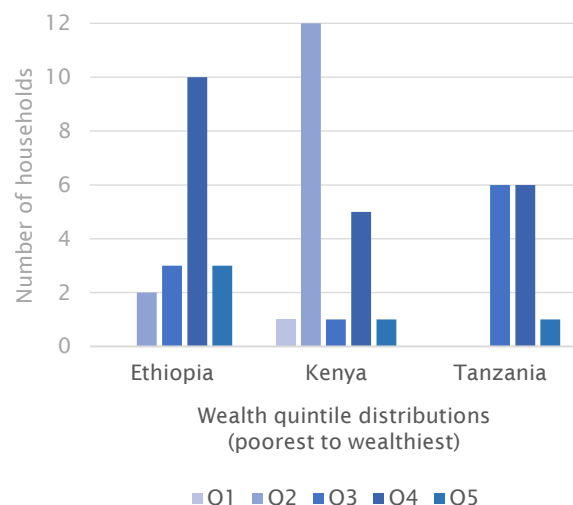


Figure 2. Categorization of household by assets and wealth. Quintile 1 is the poorest and Quintile 5 is the wealthiest.

## First impressions

The initial impressions of households when they first saw the product were generally positive, with many saying it appeared attractive and of high quality, had a good color, and seemed easy to use by both adults and children. Interestingly, due to differences in how the protocol was interpreted, the researcher in Ethiopia asked the initial impression question before explaining what the device was used for. These participants guessed that the Tap might be a water filter, a handwashing product, a chamber pot, or a recycling bin.

The overwhelming majority of respondents thought the device seemed easy to use (79%, Figure 3), with some stating that it appears simple, easy to turn on and off, portable, and easy to close. Those who disagreed said so because they thought it wasn't clear what the device was to be used for.

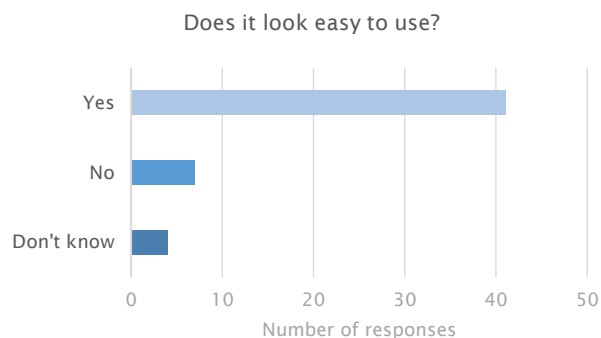


Figure 3. Initial impressions from households about whether the device looks easy to use.

Over 80% of respondents thought that the product appeared durable and that children could use it without damaging it. Most respondents liked the material of construction; almost half mentioned that plastic meant it was durable, while 10% thought that plastic made it less durable. When asked which part children would break first, several respondents identified the soap holder, which protrudes from the side of the device.

### Use case

When asked in advance about when they might use the product, the most common response was after using the toilet (Figure 4). Respondents also mentioned before cooking food or eating, when returning home, and after working in the fields. Most households said they had a plastic bottle similar to the one used in the device or could easily get one.

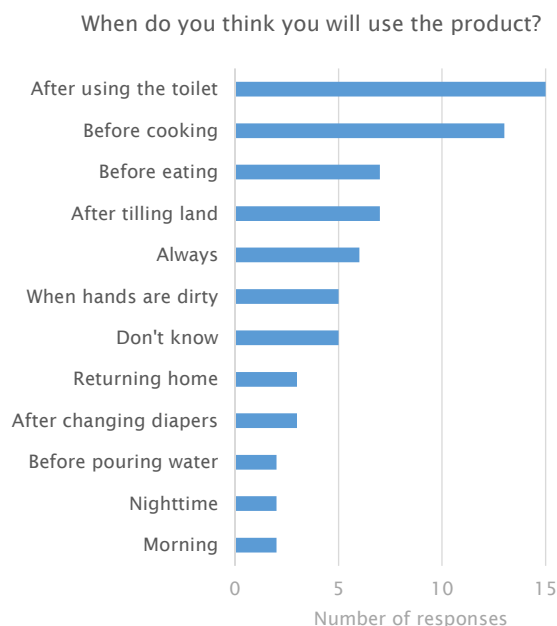


Figure 4. Times when respondents expected to use the product.

### Access to water

The main source of drinking water for households was a borehole in Tanzania, piped water into the yard or plot in Ethiopia, and surface water in Kenya (Figure 5). Most of the households in Kenya had a total travel time of more than 30 minutes to fetch water, placing them into the JMP 'Limited service' category of water access.

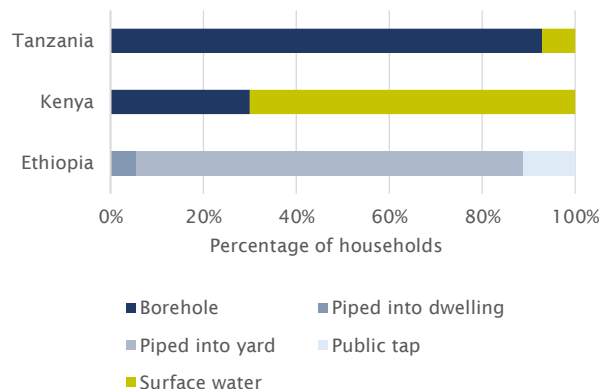


Figure 5. Main source of drinking water used by households.

### Current handwashing facility

Overall, only about half of the households had an existing place where they washed their hands and most of those facilities were mobile objects, such as a bucket or basin. Of those who had a handwashing facility, 87% had water available and 70% had soap at the time of the observation. These results were mapped to the JMP-defined handwashing service levels (Figure 6) and disaggregated by country. In the Kenya village most households had no handwashing facility, while households in Tanzania were equally divided between basic service and no facility. The highest level of basic or limited service was observed in Ethiopia, which was most likely the result of the greater access to piped water available in the yard or plot and the higher income levels in this urban location.

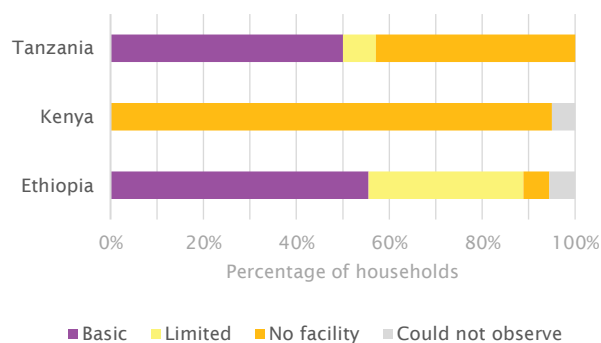


Figure 6. JMP handwashing service levels for households.

### Post-Survey Impressions

The researchers asked a series of follow-up questions after one week to learn more about how the households used the product and what could be improved. The initial impressions were coded by the sentiment expressed (positive, negative, or neutral) and by specific topics mentioned. The sentiment was

very positive overall, with most respondents stating that their impression was good or very good (Figure 7).

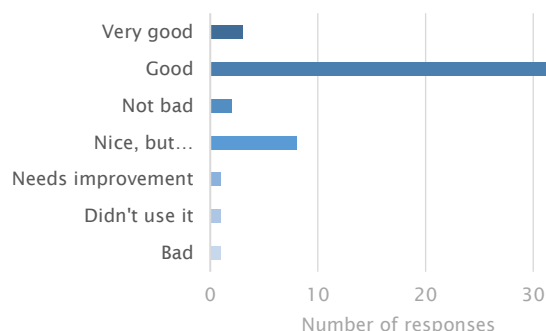


Figure 7. Sentiments expressed in overall impressions of the product at post-survey.

When respondents said something positive but then pivoted to a suggested improvement, we coded the response as “nice but.” These responses are important because in some of the countries, it is culturally important to frame any negative feedback with something positive to avoid appearing rude or offending visitors (a type of courtesy bias).

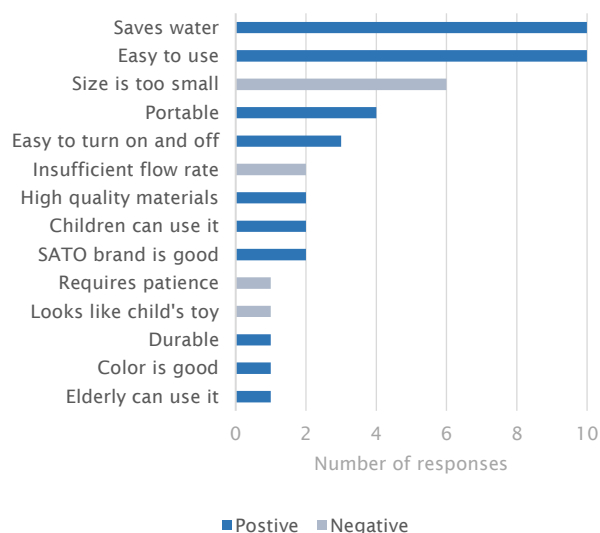


Figure 8. Specific topics mentioned in overall impressions.

The specific positive attributes mentioned included the view that the device saves water, is portable, and is easy to use (Figure 8), whereas negative comments included the small size of the unit and the slow water flow rate compared to other solutions, such as a bucket with a tap installed.

#### Box 1: Overall impressions after 1 week of use.

“The product is good and it uses water economically as compared to the use of a basin to wash hands which wastes a lot of water.” (Kenya)

“I think the product is very nice. I would prefer it to be a bit bigger. In a situation like my family where there are kids and my husband, this product is very small. Imagine coming back from the farm, with dirty hands and legs and you want to wash your hands. This one bottle is not enough even for a single person.” (Tanzania)

#### Improvements suggested

After a week with the SATO Tap, many respondents had suggestions for improvements to the product, which mainly centered around the size, capacity, and flow rate (Figure 9). The most common request was to increase the capacity of the reservoir, with some respondents specifically requesting that a 5-liter bottle be used. In a later section, we present specific feedback on the flow rate and number of refills per day.

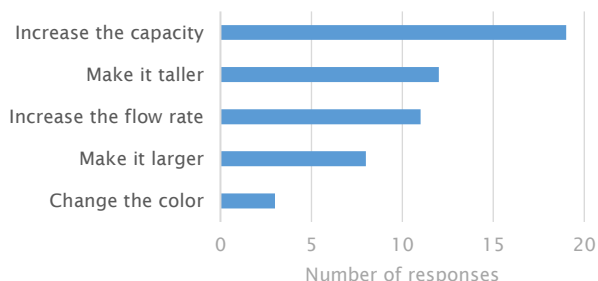


Figure 9. Suggested improvements, coded by topic.

Other commenters felt that the flow rate was too weak, or the device was too small or short, requiring them to bend down to use it (see example in Figure 10). The difficulty of bending down to use the tap was mentioned by 7 respondents, all in Ethiopia and all with elderly household members. Although the Tap is capable of being hung from ropes, as depicted on the second page photo of this report, this was not emphasized during the short time researchers had available to introduce the product. Future marketing efforts might focus more on this aspect to overcome the difficulties in bending down to low slung tables.





Figure 10. A respondent demonstrates having to bend down to use the Tap when placed on a table.

In reviewing the comments from respondents regarding overall impressions and suggested improvements, most seemed to like the design of the tap and the way it operates, often with the caveat that they would like it to be larger, serve more people, or provide a stronger flow rate. Some of these suggestions are presented in Box 2.

#### Box 2: Suggestions for improvements.

"Enlarge the product and increase the water flow because it can't serve a large gathering because it takes a lot of time for an individual to wash hands." (Kenya)

"If they increase the size of the product or the capacity of the product to carry water as well as the hole. the hole is very small and is it makes the water flow very weak." (Tanzania)

"If it was possible to increase the size so that it can carry at least four to five liters. I don't know how but may be to increase the size as well as the hole that water is dropping. The hole is very small." (Tanzania)

"As I have said earlier, the capacity of the tap should be increased so that it can carry at least a five liters bottle; also, the hole should be increased so that the water pressure will be higher. Sometime you can be in hurry, but the water pressure is too low hence you waste time in washing hands." (Tanzania)

#### Placement of the product in the home

Households were most likely to place the device outside the dwelling or near the toilet (Figure 11). Some respondents also mentioned placing it inside the house, mainly for fear of it being stolen. Several said in their comments that they wanted it near the entrance of the house so that everyone, including visitors, could wash their hands after they had been away from the house or working in the fields.

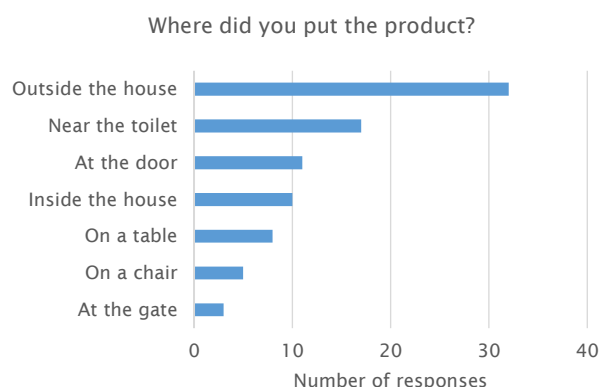


Figure 11. Coded responses for where the product was initially place by the household.

Nearly two-thirds of respondents kept the product in the original spot all week. Those who moved it generally did so each night to prevent it from being stolen. A few respondents specifically mentioned moving it out of the sun for fear that the plastic might become damaged by sun exposure. About half said that they would like to have more than one Tap so that they could wash their hands in multiple locations around the house and compound.

#### Use of the product

Respondents reported that most everyone in the house used the Tap, yet 29% said that at least someone in the house did not use it. Of households with children, 76% reported that their children used the product. When asked specifically how many times they used the product on the previous day, most respondents said between 2 and 6 times, with a few outliers that were much higher.

Another measure of use is the frequency of refilling the bottle. When asked how many times they had to refill the bottle on the previous day, most households who answered said 2 – 3 times (Figure 12), with a few reporting 4 or 5 times. Since there was significant variability in household sizes, we also calculated the number of refills per day per household member, finding a median value of 0.2 to 0.4 refills per person per day. This would suggest that a single person would need to refill the bottle every 2.5 – 5 days.

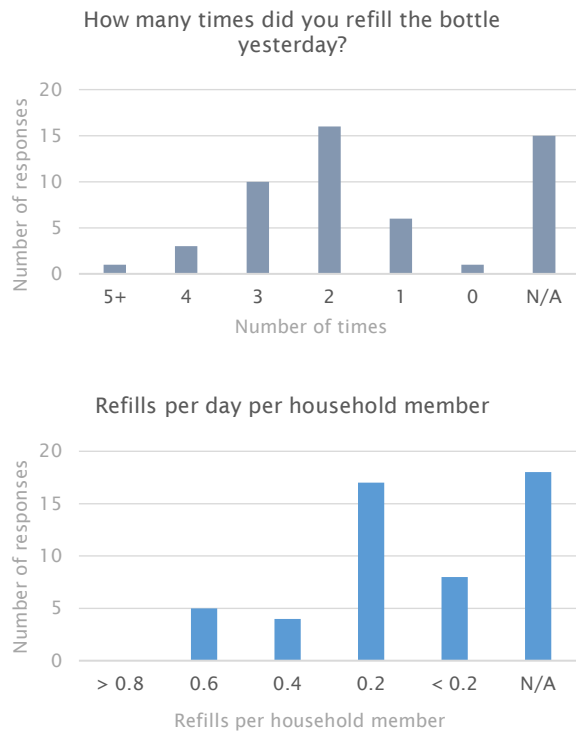


Figure 12. Number of refills per day for the entire household (top) and the number of refills divided by the number of household members (bottom).

### Functionality of the Tap

As mentioned earlier, one of the key benefits of the Tap design for many users is the ease of use. This was backed up in

answers to the specific questions about functionality. For example, 96% of respondents said the tap was easy to turn on and that the bottle was easy to refill and put back on the device. However, three-quarters of the respondents reported having to refill the device multiple times per day.

The flow rate was 'just right' for the majority of respondents in Kenya but was too weak for most in Ethiopia and Tanzania (Figure 14). Recall that the study area in Kenya is located in an extremely arid region with frequent droughts, so it is likely that these households placed a greater value on water conservation than those in urban Ethiopia or the more humid rural area of Iringa, Tanzania.

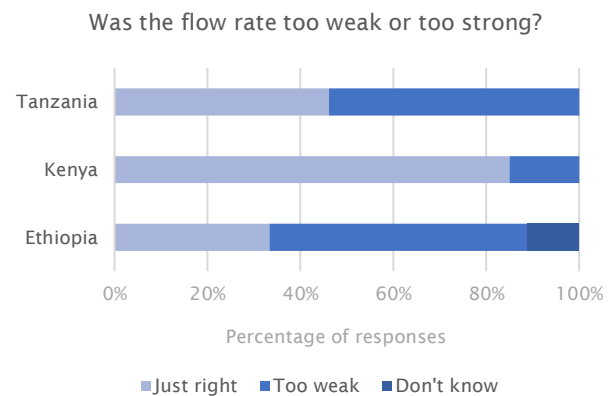


Figure 14. Viewpoints on the flow rate provided by the Tap.

Finding a suitable place for the device was not a challenge for 88% of households, but as noted previously, a small portion of households were concerned about theft of the device and this affected where they felt they could safely put it. Most



Figure 13. Various approaches taken by households for placing the Tap and collecting wastewater.

respondents found simple solutions for catching the water, including doing nothing and let it run off or placing a bucket to catch wastewater.

Most respondents had positive feedback on the potential durability and quality of materials, but several expressed specific concerns about the likelihood of various parts breaking, most notably the tap and the soap holder. Households were divided equally on the question of whether the device would last less than a year or more than a year before something broke (Figure 15). Several also mentioned concerns about leaving a plastic device in the sun, so this issue should be addressed in long term testing and in the marketing approach in sunny regions.

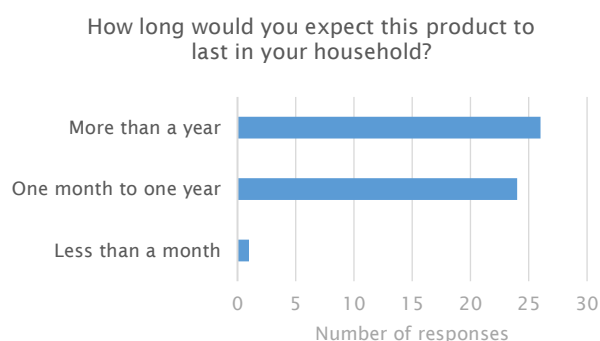


Figure 15. Views on how long it the device will last.

### User experience

We asked respondents to compare the SATO Tap experience to the old way of washing their hands, and the results were overwhelmingly positive (Figure 16), with 83% of those who shared an opinion saying that it was better than the old way.

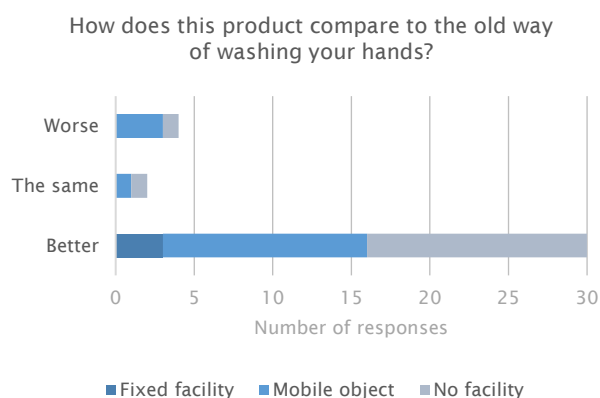


Figure 16. Sentiments expressed about the SATO Tap as compared to the old way of washing hands, disaggregated by type of handwashing facility used prior to the study.

Some specific topics mentioned by those who thought the Tap was better included the ease of use, especially turning the

water on and off, and the ability to reduce water consumption while avoiding contact with the clean water basin. The negative comments included concerns about the small size of the device and insufficient water flow. One respondent emphasized the cleanliness benefits of the Tap compared to a basin of water, saying:

“I think this is better because in the bowl all of us were washing our hands using the same water. If you are not the first person to wash your hands, then you use dirty water to wash your hands, but with this Tap we are using the same amount of water to wash our hands and everyone is using clean water.”

Finally, the respondents seemed to like the color of the Tap, with over 72% agreeing that the current color – blue – is best. Other suggestions included red, green, pink, and white.

### Demonstration

Near the end of the interview, the researcher asked if the respondent could demonstrate how they use the SATO Tap. Over 95% of respondents were able to convincingly use the device, giving a clear impression that they had used it routinely during the trial period.

We also asked the researcher to give their opinion on whether the device looked like it had been used and was in a location where it could be used. In over 90% of households, the researcher indicated that the device did appear to be used.

### Additional findings from the household study

In this section we discuss some specific findings that arose from the research that could be important to the marketing of scale up of SATO Taps as part of a market-based programme to improve hygiene. Some of these issues might merit further market research.

**Comparison to alternatives.** There are two types of alternatives that the SATO Tap will be compared with: (i) no handwashing facility at all; and (ii) existing handwashing solutions used by households. Even households without a formal handwashing facility, as defined under the JMP service ladder approach, have ad hoc solutions to personal hygiene that include buckets, pitchers, and basins. In the Kenya village studied, we found that none of the households had a handwashing facility with water and soap available. However, in Tanzania and Ethiopia, we found two types of mobile handwashing devices that were ubiquitous in each area. In Ethiopia, most households had a plastic pitcher and plastic basin in the home, often with a bottle of liquid soap (Figure 17). In Tanzania, about half of the households had a basic handwashing facility that consisted of a 10- or 20-liter bucket with a tap installed at the bottom. The difference in these local preferences might be explained by market availability and household income but also by the difference in water sources. In Ethiopia, most households have piped water into their yard



or plot, making it easy to refill the smaller pitcher whereas in Tanzania households had to fetch water from a community borehole, leading to a need for greater water storage capacity.

In terms of marketing and sales at retail shops, the type of alternatives available and their relative prices are important and very different across the countries. As we discuss in the following section, few retailers in the remote rural village in Kenya sell any kind of handwashing products so the task in this area is essentially to establish a new market segment. Therefore, in Tanzania, the SATO Tap could be a better value than the bucket with tap and would compete versus a tap that is installed in an existing bucket.

The opposite situation was found in the Ethiopian households, where the main alternative, a plastic pitcher and basin, is less functional (cannot be turned on and off) but very inexpensive. In order to convince these households to adopt the SATO Tap, the marketing approach might need to focus on the convenience and cleanliness of the tap compared to the open bucket and basin.



*Figure 17. Alternative handwashing devices used in Ethiopia and Tanzania.*

**Bottles used in the SATO Tap.** One objective of the rapid prototype testing was to confirm the availability of the 2-liter bottles used in the SATO Tap. In Tanzania, it is unusual to find 2-liter bottles of soda or water for sale in shops, as 1.5-liter bottles are often the largest sold. Larger volumes of water would usually be stored in buckets. In fact, we noticed a phenomenon in Tanzania in which households were provided with the proper 1.5-liter bottle at the beginning of the trial, but upon return we found that they had replaced this with a smaller soda bottle and used the 1.5-liter bottle for some other purpose (Figure 18).



*Figure 18. In Tanzania, several households replaced the 1.5-liter bottle provided with smaller soda bottles.*

We already noted previously the desire that many respondents had expressed for a larger water volume so that the Tap does not need to be refilled as often. The intersection of this preference with the lack of availability of larger bottle sizes in local markets might be a future design consideration for the Tap. Whereas the Tap is designed to make it possible to use any kind of local bottle available, the relative scarcity and value perceived in having a larger bottle might mean that the benefit of using locally available bottles might not be easy to achieve if the capacity were to be increased. Since the most popular aspects of the SATO Tap are the ease of use and being able to turn the flow on and off with one hand, a version that could be fitted to larger containers, such as the ubiquitous 20-liter buckets that are frequently found in households across the three countries, could be very popular with households.

**Concerns about theft and damage outdoors.** As noted in previous sections, several households were concerned that leaving the SATO Tap outdoors might lead to it being stolen or damaged by exposure to sunlight. In the case of theft, the portability of the Tap, which many saw as an advantage to the design, could also become a liability. Programs to promote handwashing often focus on having a handwashing facility near the toilet, which in most of these households is a separate structure not attached to the main dwelling. Given the

appealing visual design and portable nature of the SATO Tap, promotion efforts must also somehow address concerns about theft and damage in order to fully realize the health benefits of washing hands after using the toilet.

## Retailer results

In the survey protocol, we targeted 3 – 5 retailers per country to interview who were located in the household study areas to learn about their perceptions of the product and likelihood of selling it. We found a total of 10 retailers, of whom 7 said they would consider selling it (Table 2), before knowing the price.

*Table 2. Retailers interviewed by country.*

	<b>Ethiopia</b>	<b>Kenya</b>	<b>Tanzania</b>
Retailers interviewed	3	4	3
Who would consider selling the SATO Tap	2	4	1

## Feedback and suggestions

The main feedback about the SATO Tap from retailers echoes the finding of the household trial, with 7 of the 10 retailers suggesting that the size of the bottle and/or flow rate could be increased.

### Box 3: Comments and suggestions from retailers

“It looks like an item which will make ones life simple. It definitely looks easy to use.” (Ethiopia)

“[It is] new in the market and it will attract customers. Also, having sold SATO pans before, it will be easier to sell it to the same customers.” (Kenya)

“The product needs to be enlarged so that it can accommodate a larger bottle of water. Sell it at affordable costs considering that community members earn a minimal wage and would not be able to afford expensive products.” (Kenya)

## Availability of bottles

Only 20% of the retailers interviewed said they sold bottles in the size range needed for the SATO Tap and only one out of the 8 remaining retailers knew of somewhere nearby where someone could purchase them. This finding backs up some of the concerns found during the Household survey regarding the availability of bottles of the appropriate size.





Housewares shop in Ethiopia. Photo credit: Merry Miressa



## Key findings

The SATO tap rapid prototype testing generated useful information from households and retailers that can help inform future marketing, promotion strategies, and possible design improvements for the product. By conducting the study in three different East African countries with a variety of settings, we uncovered important lessons for both UNICEF and LIXIL regarding the importance of local market factors and consumer preferences. The applicability of these results is limited by the small sample size of 52 at three sites, so additional market research should be conducted during the rollout period to validate the findings summarized here.

1. **Households found the SATO Tap appealing, easy to use, and a clear improvement over other alternatives.** Some key selling points mentioned by households include the ease with which the user can turn the water on and off, the health benefits of not sharing an open reservoir or basin with others, the efficient use of water, and the fact that the device is portable.
2. **Over 90% of households used the product during the 1-week trial period and only 10% took the buy-back offer.** Most of the feedback after the trial period was positive, and 71% said that every member of the household used the Tap.
3. **The ease of use of the SATO Tap is particularly beneficial to children and the elderly.** Three-fourths of households said that their children used the Tap, and some said they liked the fact that children and the elderly can use it without needing help.
4. **Most households have to refill the Tap two or three times per day and over 40% suggested increasing the capacity or size of the device.** Many respondents would like to see the reservoir volume increased to as much as 5 liters, but even bottles in the design range of 2 liters can be hard to find locally.
5. **In arid regions, the low water use of the Tap was a major selling point.** The study included a village in an extremely arid region of Kenya where households generally did not have any kind of handwashing facility. These respondents valued the water efficiency of the device. In contrast, in non-arid regions, such as the Tanzania study area, most respondents asked for higher flow rates and a larger reservoir capacity.
6. **The most critical location for handwashing is near the toilet; however, several households expressed concern about theft or damage if they leave the Tap outdoors.** Hygiene promotion programs generally emphasize the need for handwashing facilities near the toilet, but this could be a problem for the Tap since it is very portable, and households may feel the need to keep it inside the home to protect it from theft.
7. **Half of households said they would like to have more than one SATO Tap.** Since critical handwashing times include using the toilet, before eating and preparing

meals, and after coming home from public spaces, having more handwashing locations might lead to greater use.

8. **When marketing the Tap, different attributes should be emphasized depending on the local population and available alternatives.** The three locations we studied were very different in terms of their interests and concerns:

- Where relatively few households already have handwashing facilities (e.g. Kenya, in this study), the novelty of the device and the perceived benefits to health and wellbeing, as well as the low water use, appear to be most persuasive.
- Where there is a cheaper but less functional alternative, as we found in an urban area of Ethiopia, the improved functionality and convenience of the device would be important to emphasize, since the household is being asked to pay a premium over the other alternatives.

In conclusion, these findings suggest that program models to promote the SATO Tap should be adaptive to local market conditions and consumer preferences, which varied greatly across the three areas in this study. The response of users to the device was overwhelmingly positive, and most respondents felt that the Tap provided an improved handwashing experience over the other alternatives available to them. This provides some support to the hypothesis that a market-based hygiene promotion approach that includes the SATO Tap could lead to more frequent and sustained handwashing, especially among children, the elderly, and household members who suffer from physical disabilities, but this needs to be further tested through both market research and observational studies of household behaviors.